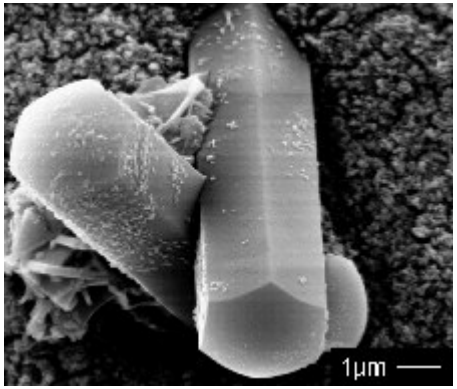
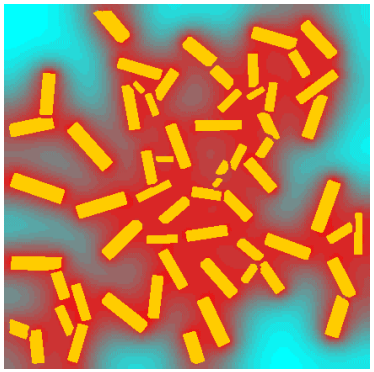
Nanometer Scale Induced Structure between Amorphous Layers and Crystalline Materials

W.C. Carter, MIT, DMR-0010062*

Silicon nitride is a structural ceramic that depends on relatively weak grain interfaces and elongated grains to promote high toughness. As part of the greater project examining interfaces in ceramics, we investigate the role of rare earth (RE) dopants on the morphology and properties of polycrystalline Si_3N_4 ceramics. Comparison of experimental and computational statistics gives insight into the effects of RE dopants.



Model grain growth experiments in Si-N-O-Mg+RE glasses supersaturated with respect to Si_3N_4 are conducted by Dr. R.L. Satet at Karlsruhe University.



A simple 2-D grain growth model is manipulated to test the effects of matrix diffusivity and interface kinetics on grain growth statistics.

*In cooperation with the European Union under contract G5RD-CD-2001-00586

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As part of this international partnership, Dr. Catherine Bishop, a Post-Doc from MIT, has spent the past year at Oxford University with EU PIs Professors David Cockayne and Adrian Sutton. During this time, she has given seven talks in Europe and the US on her work within the NANOAM project.

Ana Ramos, who received her B.S. from MIT in June 2004, worked with Ming Tang, a graduate student at MIT, and, during a summer at CEA-Saclay, Dr. Martine Gautier-Soyer, a EU PI.

Two US partners, ORNL and UCBerkeley, have benefited from EU post-doc Dr. Raphaelle Satet's 3 month long visits. Several papers are in preparation as a result.

March 2004 NANOAM Meeting at MIT.
Students and Post-docs gave 7/17 technical talks.

*EU contract G5RD-CD-2001-00586